

7. (Newly Added) An ETC system of claim 6, wherein said processor means decides a vehicle that has been detected by said vehicle sensor in said radio-communication zone is an ETC vehicle if a radio response to said radio signal is detected from said vehicle.

Remarks

The following is a response to the Office Action dated July 13, 2001.

Regarding the objection to Figs. 1-4 as noted in item 1 of the Office Action, applicants respectfully submit that the structures as shown in Figs. 1-4 are not prior art against this invention. See page 3, lines 21-22 of the specification.

In response to the objection of claim 1 in item 4 and the rejection of claim 3 under 35 U.S.C. 112, second paragraph, in item 8¹, claims 1 and 3 have been amended to rid both the objection and the indefiniteness rejection. Accordingly, it is believed that the objection of claim 1 in item 4 and the rejection of claim 3 in item 8 of the Office Action are now both moot.

In item 6 of the Office Action, claims 1-5 were rejected under 35 U.S.C. 102(b) as being anticipated by Hassett et al. U.S. patent 5,406,275 (Hassett).

Applicants respectfully submit that the rejection by the examiner of claims 1-5 under Hassett is without merit as follows.

¹ Insofar as claim 3 depends from claim 1 and the term "standard" is recited in claim 3, applicants respectfully submit that it is only claim 3 that should be rejected under 35 U.S.C. 112, second paragraph in item 8 of the Office Action.

The instant invention (ETC) electronic toll collection system is a system that detects whether a vehicle coming within its radio communication service zone is a ETC vehicle from which toll charges can be automatically collected, or a non-ETC vehicle that requires manual collection. In particular, the ETC system of the instant invention is located at the toll gate and comprises means for outputting a signal from an antenna to a vehicle that is detected within a limited radio-communication service zone. Only when a response is received from the vehicle that is detected to be within the limited radio-communication service zone would a determination be made that that vehicle is an ETC vehicle. If no response is received, then the determination is made that the vehicle is not an ETC vehicle.

The invention of claim 1 therefore features: 1) second means for deciding whether or not a radio response to the radio signal is received via the antenna; 2) third means for, in cases where the second means decides that a radio response to the radio signal is received, judging that there is an ETC vehicle incoming; and 3) fourth means for, in cases where the vehicle sensor detects a vehicle while the second means decides that a radio response to the radio signal is not received, judging that there is a non-ETC vehicle incoming.

In contrast, the Hassett system is directed to overcoming the prior art problem of determining whether a vehicle is in a proper lane of a multiple lane toll plaza. To differentiate the particular lane the vehicle is in, the vehicle has to carry thereon a vehicle transponder 28 that detects the relative strengths of various signals being output from the various transmitters (18, 20, 22) respectively located at each of the lanes of the multiple lane roadway. Each of the signals output from each of the transmitters 18-22 is in the shape as shown in Fig. 2, with a main lobe 40 that contains most of the radiated energy, and a number of side lobes 42. By comparing the strengths of the various signals received, the transponder 28, more precisely the

various components as shown in Fig. 4a of the transponder, makes a determination that the vehicle is in a particular lane of the multiple lane roadway by corresponding the signal of the greatest strength with the transmitter that transmitted that signal and the lane where the transmitter is located. See column 4, lines 10-20. See also column 8, lines 56-68. Thus, the Hassett system focuses particularly to the transponders 28 of the vehicles for determining which lane a vehicle is on in a multiple lane toll plaza.

Thus, in the Hassett system, radio communications are implemented between a mobile transceiver and a stationary transceiver, and the distance therebetween or the relative positions thereof are calculated on the basis of conditions of the radio communications. Hassett therefore fails to teach the above-indicated features of the invention of claim 1 that the decision is implemented as to whether an ETC vehicle or a non-ETC vehicle is incoming, and that ETC/non-ETC decision is responsive to whether or not a radio response is received.

Compare this to the instant invention, which is directed to a system at the toll plaza that determines whether an incoming vehicle is a ETC vehicle or a non-ETC vehicle.

In view of the foregoing, applicants respectfully submit that the instant invention is patentably distinguishable over the prior art. Accordingly, reconsideration of the application and allowance of all of the pending claims are earnestly solicited.

Respectfully submitted,



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VERSION TO SHOW MARKINGS TO SHOW CHANGES MADE

Attachment Claims Pursuant to 37 C.F.R. 1.121(c)(1)(ii)

Please amend claims 1 and 3 as follows:

1. (Amended) An ETC (electronic toll collection) system comprising:
 - an antenna having a predetermined directivity for providing a limited radio-communication service zone;
 - a vehicle sensor for detecting a vehicle which reaches a predetermined position in the limited radio-communication service zone;
 - first means for transmitting a radio signal via the antenna;
 - second means for deciding whether or not a radio response to the radio signal is received via the antenna;
 - third means for, in cases where the second means decides that a radio response to the radio signal is received, judging that there is an ETC vehicle incoming; and
 - fourth means for, in cases where the vehicle sensor detects a vehicle while the second means decides that a radio response to the radio signal is not received, judging that there is a non-ETC vehicle incoming.

3. (Amended) An ETC system as recited in claim 1, wherein the limited radio-communication service zone has a length greater than a length of a [standard] vehicle and smaller than twice the length of [the standard] said vehicle.

Please add new claims 6 and 7 as follows:.

6. (New Added) An ETC (Electronic Toll Collection) system, comprising:
 - an antenna;

transceiver means working cooperatively with said antenna for outputting a radio signal at a given rating level to cover a limited radio-communication service zone;

a vehicle sensor for detecting whether a vehicle has reached a predetermined position in said limited radio-communication zone;

said transceiver means further working cooperatively with said antenna for detecting radio response to said radio signal from each vehicle detected by said vehicle sensor within said radio-communication zone; and

processor means for deciding a vehicle that has been detected by said vehicle sensor in said radio-communication zone is a non-ETC vehicle if no radio response to said radio signal is detected from said vehicle.

7. (Newly Added) An ETC system of claim 6, wherein said processor means decides a vehicle that has been detected by said vehicle sensor in said radio-communication zone is an ETC vehicle if a radio response to said radio signal is detected from said vehicle.